Official CatBox Manual - Final Version 1.02c - May 9, 1996

CatBox is a low cost, high value peripheral designed to plug into the Jaguar AV/DSP connectors on the rear of the console and provide standard ports for connectability. This powerful package gives your Jaguar audio, video, and communications features that were either optional or not available without it.

About this Manual

On the planet where our people come from, most people don't read manuals. This manual was written for those people who want a little more support and clarity in their gaming experience. If you have an affinity for lawyers then go directly to the back of the manual.

Installation

Plug CatBox directly into the back of the Jaguar where the DSP and AV ports are located. Next connect your standard audio and video cables to the back of the CatBox. Although many cable combinations and choices are acceptable, you cannot use Atari's composite or S-Video cables with the CatBox.

Un-installation

Always unplug CatBox from the back of the Jaguar before moving or transporting your Jaguar. It is heavy... it could fall off and hurt someone.

What's Inside?

CatBox consists of two printed circuit boards (PCBs) mounted inside a stylish case. The larger lower main board is called the I/O PCB. The upper board is called the AVC PCB and holds the logic, amplifier, signal conditioning, and patchwork in order to make everything work. The AVC PCB also has space for future expansion and custom designs. CatBox power is provided by the Jaguar game console. There are two LEDs on CatBox which illuminate steadily to show power and flicker during communications activity.

Opening the CatBox

There may be a need to see what is really inside the CatBox. Since most people don't read manuals, this is really intended for the novice and this will not void your CatBox warranty.

Carefully remove the volume knob by prying it off with a flat bladed screwdriver or CatBox volume knob extractor.

There are two screws that hold the CatBox metal case together and two more that hold the circuit boards in place. Remove the two #1 Phillips screws on the case bottom and slide off the top. Remove the two #2 Phillips screws that secure the CatBox I/O board to the case bottom. Do not throw the screws away! They may be needed later.

Lift the board assembly out of the case bottom and pull the two boards apart with your fingers.

The top AVC board which looks like it is mounted upside down has all the electronics on it that make CatBox work. The bottom I/O board has most of the connectors on it and the LEDs. The user moveable jumper plugs are all on the AVC board.

Assembly is just the reverse. Take care of the headphone volume control as it is fragile. Also there are two spacing washers on the bottom side of the I/O PCB. Make sure that these washers are still in place when reinstalling the board sandwich into the case.

Wow!

Besides looking extremely cool, CatBox provides three main functions for Jaguar owners. These are Audio, Video, and Communications (AVC). Each has three sections for a total of nine incredible features!

AUDIO SECTION

Audio signals are distributed on CatBox in three different places. These are the RCA type line level audio output jacks for left, right, or mono audio output, the mono line level audio output for an RGB monitor with audio support, and the amplified stereo headphone jacks.

Line level audio.

The I/O PCB has two RCA phono jacks that pass high quality line level audio signals (600 ohm) from the Jaguar to other audio devices such as audio pre-amplifiers. The red colored jack passes right audio while the white colored jack passes either left or mono audio. The left/mono switching logic works in the following manner. When an RCA cable is plugged into the right audio jack, the white jack passes the left audio signal. When there is no plug inserted into the right audio jack, the white jack passes the sum of left and right audio which is called mono. ˇJse standard RCA stereo audio cables.

RGB monitor audio.

Pin 9 of the Analog RGB connector also carries the mono audio signal. This signal is used for Atari SC1224 or SC1435 monitors or any other monitor that has an audio amplifier and passes mono audio through its monitor signal cable. Since most users will prefer to use stereo audio, this mono signal is automatically disconnected when an RCA cable is plugged into the right/mono (red) audio jack or when headphones are installed. This function can also be disabled by removing jumper J1 (RGB Audio). For more information, see Analog RGB in the Video Section.

Headphones

CatBox includes dual stereo headphone jacks on the AVC PCB. These support the common 3.5mm (1/8 inch) size headphones as used with most portable stereo equipment. Low noise amplification is provided to match the 32 or 16 ohm loads common with headphones. We have found that headphones with a sensitivity rating of about 100 dB SPL/1mW work very well with the CatBox. Headphones with lower sensitivity numbers usually have lower quality sound and lower volume.

The headphone jacks take top audio priority and will disconnect all other audio output signals when a 3.5mm plug is inserted. There is a volume control knob on the rear of the CatBox. Take care when adjusting this level as higher volume levels for extended periods of time may cause permanent hearing damage. Optional headphone extension cables are also available for your convenience.

VIDEO SECTION

The three video outputs from CatBox are Composite Video, S-Video, and Analog RGB. These three and the Jaguar RF output may all be used at the same time or in any combination to connect multiple displays. Analog RGB has the best quality display while Jaguar RF has the lowest quality. Composite is much better than RF and S-Video is better than Composite. The output you will use depends on the capabilities of your television or monitor. Refer to the chart below.

<u>HIGHEST QUALITY DISPLAY</u>
1. Analog RGB
2. S-Video
3. Composite Video
4. Jaguar RF

<u>LOWEST QUALITY DISPLAY</u>

Composite Video

The yellow RCA jack provides composite video out. This signal is commonly available on VCRs and may be used for recording purposes. Since composite video has no provisions for audio, be sure to use one of the CatBox audio sources as well.

S-Video

S-Video used to be called S-VHS but was often confused with the totally different S-VHS high definition video tape standard. S-Video has also been called Composite Chroma and Composite Luminance and was used in the early 1980s on the Atari 800 XL and the C-64 computers. Today the standard S-Video connector is the 4 pin round mini DIN as found on many high end VCRs, TVs, video cameras, and CatBox. S-Video cables are commonly available at Audio/Video stores. S-Video provides an extremely sharp picture that is surpassed only by a good analog RGB monitor.

Analog RGB

This connector is a female (holes instead of pins) DB9 located between the composite video and S-Video connectors. Don't confuse this with the other DB9 on the CatBox I/O PCB which is male (pins) and provides RS232. The Jaguar supports Analog RGB monitors with a Horizontal Sync rate of 15.75 KHz. These monitors were very popular around 1985 but are not all that common anymore since VGA which has an H-Sync of 31.5 KHz became the new standard. Look in the older used market for some great bargains. An H-Sync rate of 15.75 KHz was found more commonly on monitors made between 1984 and 1990. The Atari ST color monitors and the Amiga color monitors both supported this slower H-Sync rate.

Since there is no one standard for RGB connections, custom RGB cable adapters are available to adapt most monitor cables. These include Atari SC1224/1435, Amiga, DB9, and DB15. If you would like to make your own cable adapter, the pin connections follow.

DB9S - on CatBox. Use a DB9P for your adapter.
1 Red
2 Green
3 Blue
4 Horizontal Sync
5 Vertical Sync/Composite Sync (VS/CS)
6 Ground
7 Ground
8 Ground
9 Mono Audio/NC

Note that the jumper labeled J7 (VS CS) on the AVC PCB allows you to select Vertical Sync (VS) or Composite Sync (CS) which is a combined sync signal and should not be confused with Composite Video. The CatBox default is set for VS. If the vertical screen of your monitor keeps rolling after adjusting vertical hold, try moving this jumper to the CS position. If you still cannot get a good vertical hold then your cable adapter or monitor may be bad.

The mono audio signal which feeds to the Analog RGB connector may also be disabled by removing the audio jumper J1 on the AVC PCB. Although there is built in protection so that leaving this jumper enabled will not cause any problems, it is a good idea to disconnect J1 if you do not plan to use the AtariSC monitor adapter.

The following is a list of compatible Analog RGB monitors that have been tested and the adapter requirements.

15.75KHz Horizontal Sync monitors that have been tested and their general requirements.

Monitor/Model	Adapter	J7 Position	J1 Position
Atari SC1224 JVC	AtariSC	VS or CS	ON
Atari SC1224 Goldstar	AtariSC	VS Only	ON
Atari SC1224 Samsung	AtariSC	VS or CS	ON
Atari SC1435 Magnavox	AtariSC	VS or CS	ON
CBM 1084D Magnavox	Amiga23	CS Only	OFF
CBM 1084S Magnavox	Amiga23	CS Only	OFF
Commodore 1950	Amiga23		OFF
Magnavox Pro RGB 80			OFF
NEC Multisync Color	None	VS Only	OFF
NEC 3D	HD15S	VS Only	OFF
Sony 1302			OFF
PrincetonGraphicsUltra 14	None	VS Only	OFF

Please write or send a fax if you have any questions about other monitors or would like a custom adapter made. Please also send us your positive experiences with other RGB monitors that we have not listed so we can let others know. Please do not ask us to support VGA and SVGA monitors that can't sync down to 15.75KHz. The required scan doubling adapter would cost more than the Jaguar even if manufactured in high volumes.

There are exceptions to the above rules. For example if you have a Commodore 1084 monitor with a monitor cable that was designed to connect this monitor to an Atari ST computer, then you must use the AtariSC adapter instead of the Amiga23.

Atari SC1224 & SC1435 History

The following information is an attempt to clear up the confusion in identifying the three different SC1224 monitors made for the Atari ST. These are all 12 inch color monitors and were later replaced by the SC1435 14 inch color stereo monitor which was made by Philips/Magnavox. Most of these monitors have not been manufactured for several years but are readily available in the used computer markets for a reasonable price.

The oldest was made by JVC and is identified by the "Made in Japan" label on the back. These were mostly made in 1985. The FCC ID number is EBA90YSC1224. The signal cable and power cables both unplug from the rear of the monitor. The case top has ventilation slots. The JVC has a two-tone color scheme with a dark gray bezel (around the tube face) and a light gray casing. The push On/Off power switch is on the front bottom next to volume and contrast knobs. The JVC monitor is the best of the SC1224s.

Next came the Goldstar monitor which was "Made in Korea" in 1986. The FCC ID is EBA9QKSC1224. The signal cable does not unplug from the rear. The case top is solid and the entire case is light gray in color. There are three knobs all on the right side of the case. These are On/Off/Volume, contrast, and brightness.

The last SC1224 was also "Made in Korea" in 1987 by Samsung. The FCC ID is A3L9QNSC1225. Perhaps they had intended to call this the SC1225 when it was registered. Both the signal and the power cables are fixed in the case and cannot be unplugged. Like the JVC monitor, the Samsung is back to the two-tone color scheme with a dark gray bezel and light gray casing. The push On/Off power switch is on the front bottom next to volume, brightness , and contrast knobs. This is the least desirable and ugliest of the SC1224 monitors but it does work.

In 1990 the SC1435 was "Made in Taiwan" for Atari by Philips/Magnavox. This is a 14 inch stereo monitor. Both cables unplug in the rear. The color is all light gray and a nice swivel stand is available. The push On/Off switch is on the rear. This is the best color monitor made by Atari for the ST and also works quite well with the CatBox.

COMMUNICATIONS SECTION

Two new communications methods are available on CatBox along with a DSP pass through. These are called CatNet and RS232. With the appropriate cables, communications allow you to connect two or more Jaguars together for multi-player games either directly or with modems. Each method is exclusive depending on the toggle switch position on the rear. The three position communications toggle switch next to the RJ11 jacks, points to the port which is enabled.

UP = CatNet. Center = DSP Pass though. Down = RS232.

The dual purpose LEDs (lights) also show communications activity. They should turn on when CatBox receives power and they should flicker when the CatBox receives data. Depending on the data transferred, the flickering should be visible to the human eye up to about 115K baud.

Game Support for Communications

Since the Jaguar is a cartridge based system and not user programmable, drivers, baud rates and protocols are set by game developers. You cannot play a game over a modem unless that feature is supported by the game you are playing. You cannot play a game over CatNet unless your game specifically supports CatNet.

As of May 1996, there are three known Jaguar games that currently support communications.

1) Doom from Atari has a two player head to head mode that supports the CatBox RS232 ports using a null modem cable. Doom does not support CatNet.

2) Aircars from MidNite Entertainment Group supports the RS232 null modem cable for two players as well as CatNet from two to eight players. This game has not been published as of this date although it was completed over one year ago.

3) BattleSphere from 4Play supports up to 8 networked Jaguars and up to 2 players per Jaguar (up to 16 player total) with CatNet. The null modem cable is also supported for networking just two Jaguars. This game is nearing completion but has not yet been published. It is not clear whether modem support will be included. BattleSphere is an awesome 3D space battle game and looks like the reason to hang on to your Jaguar and pick up another.

RS232

RS232 was an early serial communications standard that became popular in the 1970s for computers and terminals. It has been widely endorsed in the electronics industry and is found on virtually every computer made today. RS232 is used primarily for connecting input and output devices like printers, modems, and pointing devices although many other creative uses have been found for it. Simple RS232 is provided on CatBox through a male DB9 on the I/O PCB. This is connected as in the IBM AT standard as follows.

DB9P on CatBox

1 NC (DCD)
2 RXD (receive data)
3 TXD (transmit data)
4 DTR - always on
5 Ground
6 NC (DSR)
7 NC (RTS)
8 NC (CTS)
9 NC (RI)

Note that there is no hardware handshaking. DTR is fixed on. DSR is connected to RTS. An IBM AT type null modem cable may be used to connect two Jaguars together by their RS232 ports. An IBM AT type modem cable may be used to connect CatBox to a modem.

CatNet

The communications toggle switch should be in the up position to select CatNet communications. CatNet was developed by Black Cat Design to be a low cost, reliable network standard that would allow up to 32 Jaguars to play in a local network type environment. CatNet is a half duplex, dual-differential type of communications based on the RS485 standard. CatNet uses inexpensive 6P4C RJ11 phone type connectors and cabling and is reliable up to 115K baud with long cable lengths. Although it was designed to support 32 devices, we expect to see it used more often in small local networks with a maximum of 4 or 8 players.

Although common American Standard telephone extension cables may be used, 4 or 6 conductor cable is required. Because of the wiring scheme used, plug polarity does not matter. Cable runs of 1000 feet have been successfully tested but it is more practical to keep cable runs under 100 feet between Jaguars. Terminator plugs are not required but should be left in the unused CatNet ports (at the ends of the network) when running a network with long cables over 100 feet. Low cost 25 foot cables and replacement terminators are available from ICD.

DSP pass through port

A DSP pass through port has been provided for compatibility with future devices that may require it. The communications switch should be in the center neutral position when using devices plugged into the DSP port. The DSP pass through lines are directly connected to the Jaguar UART regardless of the switch position. Therefore, you should always unplug the DSP device before selecting one of the other communications ports.

Observations from network experience

When initializing communications in a network or on a modem, it is possible to lock up one of the Jaguars. The offending Jaguar will be sending but not receiving any data while the others in the network are. The result is that you will not be able to proceed from initialization into network play. The solution is simple. Just reset the offending Jaguar by powering it off and on again. Also, it is good practice not to log two Jaguars on to a network at precisely the same time. Instead log them on consecutively.

Options and miscellany

The following CatBox parts and accessories are available from ICD and better dealers. ICD cables are excellent.

CatBox Complete	$69.95
Video Cables & adapters	
Composite Video & Audio 6 foot	$ 9.95
Composite Video & Audio 12 foot	$14.95
S-Video Cable 6 foot	$ 8.95
S-Video Cable 12 foot	$12.95
AtariSC RGB adapter	$14.95
Amiga23 RGB adapter	$14.95
HD15S RGB adapter	$ 9.95
Custom RGB adapter	$19.95 (supply pinouts)
Audio Cables	
Headphone extension 10 foot	$9.95
Stereo Audio 6 foot	$3.95
Stereo Audio 12 foot	$5.95
Communications cables	
Modular null modem cable 25 foot	$9.95
CatNet cable 25 foot	$4.95

Replacements for lost or damaged parts

CatNet terminator	$4.95
CatBox AVC PCB Complete	$39.95
CatBox I/O PCB Complete	$29.95
CatBox Case Complete	$19.95

Since all of the electronics are located on the top CatBox AVC PCB, replacing this board should solve 99% of all problems that you may encounter.

If you cannot find these products or parts at your computer or electronics dealer, send check , money order (US$ drawn on a US bank) for the correct amount or your Visa or Mastercard number along with your order to ICD. Please include $5 shipping & handling for continental USA shipments or $10 for all other orders. Illinois residents please add 6.25% sales tax. Sorry, no CODs or foreign bank checks.

The end?

Every effort has been made to make this a cost effective, innovative, indispensable peripheral for your Jaguar system. We apologize for any delays but there were no shortcuts taken and we wanted to make this product right. We would like to hear your comments and suggestions.

We would like to thank the following humans and objects:

John Sanderson of MidNite E.G. for the first solid network test code.
David Ebner for play testing and pushing us to finish.
Doug Engel at 4Play for incredible network code and ships.
Scott Le Grand at 4Play for an incredible game engine.
Stephanie Wukovitz at 4Play for incredible music.
4Play for the best darn Jaguar game of all time.
Richard Miller for pushing the headphone amplifier.
Bill Rehbock for starting us in Jaguar development.
Leonard T. for the "yucks".
Atari Corp. for not approving this product when it really mattered.

Because we care, we would like to hear your comments and suggestions. Please write or send your comments on the registration card.

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Warranty

ICD warrants to the original purchaser that this product be free from defects in material and workmanship under normal authorized use for a period of 90 days from date of purchase as evidenced by your sales receipt. During this time, ICD will replace or repair the defective product free of charge. After the expiration of the warranty period, the purchaser must assume the entire cost of all necessary servicing, repair, or correction.

This warranty is null and void if the product is missing parts or damaged from service attempts by anyone other than ICD or its authorized warranty agents. Accidental or intended damage or neglect is not covered. If the product displays a fault during the warranty period, the user should return it directly to ICD along with the original sales receipt. Make a copy for your own records. No return authorization is required. Send returns to:

ICD, Inc.
1220 Rock Street
Rockford, IL 61101

In any event, ICD or Black Cat Design shall not be liable for consequential damages resulting from the breach of any express or implied warranties.

For out of warranty repair, see the spare parts price list.

Read this before using - Warning!

To make our lawyers and the great American judicial system happy, we are required to inform you that anything that feels good, could be illegal and/or damaging to your health. Furthermore, do not attempt to swallow large objects as you may choke on them and electronic hardware products like CatBox are not very palatable nor completely digestible. Do not operate heavy machinery while using CatBox and your Atari Jaguar video game system.

Since CatBox does have a kicking headphone amplifier, we must warn you that using headphones at high volumes for extended periods of time can induce headaches, nausea, and worst of all, permanent hearing damage just as any high volume audio source can. It is best to plug in your headphones and turn on your video game system before they are on your ears in order to safely avoid the sudden and painful impact of high dB sound. While we consider this common sense, the American way requires us to warn you.

And finally, do not play video games in the shower or bathtub. That is just plain weird!